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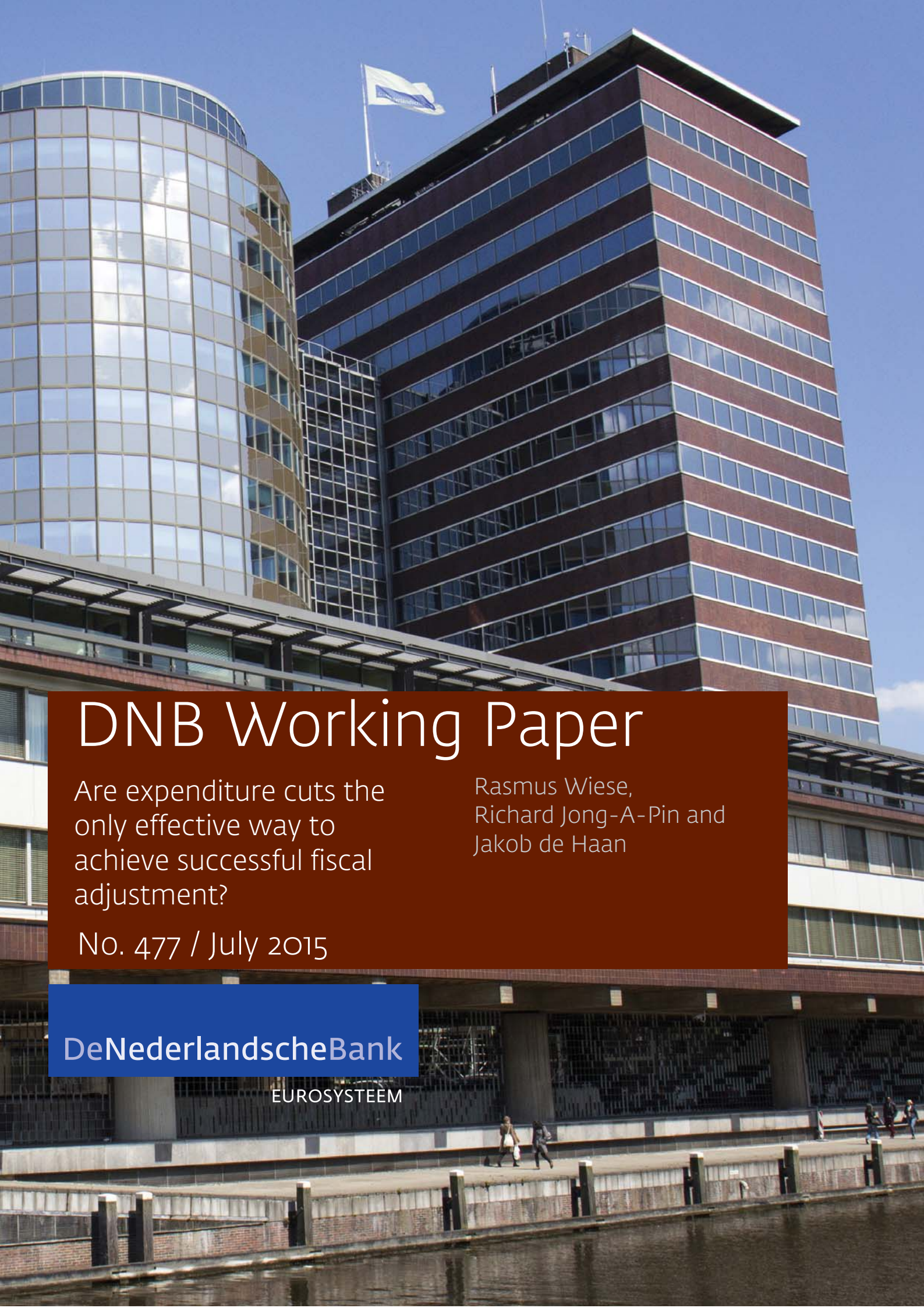

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* Views expressed are those of the authors and do not necessarily reflect official positions of De Nederlandsche Bank.

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Are expenditure cuts the only effective way to achieve successful fiscal adjustment? *

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Abstract

We re-examine whether successful fiscal adjustments are characterized by spending cuts. We apply the Bai & Perron structural break filter instead of ad hoc rules to identify fiscal adjustments in 20 OECD countries. Our estimates using conditional fixed effects logit models suggest that we cannot reject the hypothesis that the change in expenditures is equal to the change in revenues in successful fiscal adjustments. Most political-economy variables considered are not robustly related to successful fiscal adjustments. However, we find evidence that the political fragmentation of government affects the likelihood to observe a successful fiscal adjustment.

Keywords*:* fiscal adjustment, fiscal consolidation.
JEL classifications*:* H200, H300, H500, H620.

* The views expressed do not necessarily reflect the views of De Nederlandsche Bank. Rasmus Wiese was an intern at DNB.

1. Introduction

Fiscal policies in several countries across the world have become unsustainable. Therefore, fiscal policy adjustments are inevitable to reduce government indebtedness. An important issue is how policymakers should get their fiscal house in order. According to Broadbent and Daly (2010: 6), "[t]he consensus within the academic literature is that successful corrections of severe fiscal imbalances share two essential features: they are decisive and they focus on cutting expenditure." Likewise, Alesina and de Rugy (2013: 8) argue that "evidence suggests that the types of fiscal adjustment packages that are most likely to reduce debt are those that are heavily weighted toward spending reductions and not tax increases."[1]

Indeed, several papers conclude that successful fiscal policy adjustments rely on expenditure cuts rather than increased revenues (cf. Alesina and Perotti 1995; McDermott and Wescott, 1996; Alesina and Ardegna 1998; 2010; Alesina et al. 1998; von Hagen et al. 2001; Broadbent and Daly, 2010; Biggs et al. 2010 and Hernandez de Cos and Moral-Benito 2012).[2] This literature starts by identifying a fiscal adjustment, generally on the basis of changes in the cyclically adjusted (primary) budget balance, and then examines how successful and non-successful adjustments differ from each other. Success is generally defined in terms of the lasting effect the adjustment program has on reducing the government debt-to-GDP ratio and/or the budget deficit-to-GDP ratio (Mierau et al., 2007).

We re-examine the evidence that successful fiscal adjustments are characterized by spending cuts.[3] Our paper makes the following contributions to the literature. First, we apply the Bai and Perron (1998, 2003) (B&P) structural break filter to detect statistically significant changes in fiscal policy in OECD countries. This approach, which was suggested by Wiese (2014) to identify structural reforms, is less subjective and ad hoc than approaches used in this line of literature so far. Adjustments are generally defined in the literature as a discretionary (i.e. cyclically adjusted) significant positive change in the general government's budget balance. Significant in this case does not refer to statistical significance, but rather whether the change in the cyclically adjusted primary budget exceeds some threshold. So, these filters are based on a one-size-fits-all principle, as they do not take into account that the budgetary process in some countries may lead to a much more volatile budget balance than the budgetary process in other countries. A filter that does not take volatility into account is prone to identify fiscal adjustments that are the result of the budgetary institutions in place (or indeed, other factors driving fiscal policy volatility), rather than deliberate attempts of

[1] The work by Alesina and his co-authors even made it into influential textbooks. For instance, Romer (2012) refers to it. Also in policy-oriented publications several references to this research can be found. For instance, in the IMF's World Economic Outlook, October 2010 the work is described as "extremely influential in the debate regarding the consequences of fiscal adjustment".

[2] Even though the quotes of Broadbent and Daly (2010) and Alesina and de Rugy (2013) would suggest otherwise, there are dissenting views. For instance, Heylen and Everaert (2000) reject the hypothesis that to succeed, consolidation should rely on cutting the government wage bill. Ardagna (2004) and Holden and Larsson Midthjell (2013) find no indication that it matters for the success of the adjustment whether it is achieved via spending cuts or tax increases; only the magnitude of the adjustment determines its success.

[3] We do not address the related argument that expenditure-based fiscal adjustments may be less contractionary than usually thought or even expansionary. See Ardagna (2004), IMF (2010), Alesina et al. (2012) and Alesina and de Rugy (2013) for further discussion.

politicians to improve the budget balance. As such, empirical analyses that have used these ad hoc filters may suffer from severe measurement error.

Second, we estimate conditional fixed effects logit models to examine whether tax increases and/or expenditure cuts are driving successful adjustments. Several previous studies only compare the composition of successful and non-successful adjustments and derive conclusions based on differences between these types of adjustments. Such an approach ignores factors that simultaneously are correlated with the probability that a successful fiscal adjustment occurs and the choice of expenditure cuts or tax increases during the adjustment. We therefore apply conditional fixed-effects models to re-assess the 'conventional view'. Our model includes relevant economic control variables, such as indebtedness and the initial government budget balance, as well as several political-economy variables (see below). Our main finding is that we cannot reject the hypothesis that the change in expenditures is equal to the change in revenues in successful fiscal adjustments.

Third, we argue that most previous studies have ignored several potentially important political-economy determinants of successful fiscal adjustments. We find evidence that the political fragmentation of government positively affects the likelihood to observe a successful fiscal adjustment. Intuitively, the argument is that if political parties that are ideologically very different from each other agree on a fiscal adjustment, their political capital at stake is very high. Therefore, they have a very strong incentive to make the fiscal adjustment successful.

Our argument is related to that of Leibrecht and Pitlik (2015). As these authors point out, most previous studies pose that political constraints on the executive, due to factors such as divided government or a multi-party coalition, will make decisive policy actions less likely due to holdup-power of certain groups and a 'war of attrition' within the executive (Tsebelis, 1995; Roland, 2002; Gehlbach and Malesky, 2010). However, Leibrecht and Pitlik (2015: 250) argue that these factors may also contribute to "political resoluteness, i.e., 'the ability [...} to commit to maintaining a given policy' (Cox and McCubbins, 2001: 26-27)."

The paper that comes closest to our work is Holden and Larsson Midthjell (2013). These authors redo the analysis of Alesina and Ardagna (2010) using a measure of changes in fiscal policy designed to avoid reverse causality.[4] Our study differs with respect to the methodology to identify fiscal adjustments and the inclusion of political-economy determinants of successful fiscal adjustments. Using a different methodology than the current paper, also Holden and Larsson Midthjell (2013) conclude that the composition of a successful adjustment is not significantly different from that of an unsuccessful adjustment.

The remainder of the paper is structured as follows. Section 2 discusses how previous studies identified fiscal adjustments and explains our alternative approach. Section 3 outlines our modeling approach and describes the data (including the political-economy variables) while section 4 presents the results.

[4] This is done by undertaking the cyclical adjustment directly on the expenditure and revenue components and not on these variables as ratios to GDP. The resulting fiscal variable is then divided by a predetermined measure of trend GDP, to make the results comparable to those of Alesina and Ardagna (2010).

2. Identifying successful fiscal adjustments

The first step in analyzing differences between successful and non-successful fiscal adjustments is to identify fiscal adjustments. This is not straightforward, as both public expenditures and tax revenues will be affected by changes in the economy as well as by changes in policy. That is why most previous studies employ a statistical threshold for changes in the cyclically adjusted primary budget (CAPB) balance to identify fiscal adjustments. For example, Alesina and Ardagna (2010) classify a year as a fiscal adjustment period if the CAPB balance to GDP ratio improves by at least 1.5 percentage points.

This approach has been criticized as selecting adjustment episodes based on observed changes in the budget balance ignores the motivation behind the fiscal actions. Such one-size-fits-all filters also do not take into account that the budgetary process in some countries may lead to a much more volatile budget balance than the budgetary process in other countries. Furthermore, the cyclical adjustment methods may suffer from measurement errors that are likely to be correlated with economic developments, such as asset price or commodity price movements, resulting in changes in the CAPB that are not necessarily linked to actual policy changes (IMF, 2010). As an alternative, the IMF (2010) identifies fiscal adjustment episodes through examination of accounts and reports. This so-called 'action-based approach' follows the 'narrative approach' used by Romer and Romer (2010) for the identification of tax changes. However, this action-based approach is not without problems (Holden and Larsson Midthjell, 2013). It might be hard to assess the true intention of a policy change solely by reading policy documents. By including only actions which are motivated by debt reduction, and thus omitting fiscal actions for stabilization purposes, one may obtain an inaccurate picture of the actual fiscal stance. Furthermore, Perotti (2012) provides examples showing that the data might be subject to important measurement errors, as governments quite often reverse announced spending cuts in subsequent supplementary budgets.

Alesina and Ardagna (2013) argue that spending-based adjustments are more likely to reduce the debt-to-GDP ratio, regardless of whether fiscal adjustments are defined in terms of improvements in the CAPB or in terms of premeditated policy changes designed to improve a country's fiscal outlook. Likewise, Biggs et al. (2010) report that consolidations isolated under the 'action-based' method produce similar results as those identified based on changes in the CAPB.

Our approach to identify the beginning of fiscal adjustments is based on the identification of changes in the Data Generating Process (DGP) of fiscal variables, for example, as a result of a fiscal adjustment (Hansen, 2001). Bai and Perron (1998, 2003) develop a general method for this purpose. Consider a model with m possible structural breaks[5]:

$$y_t = \partial_j + \mu_t \qquad (t=1,\ldots.T;\ j=1,\ \ldots m+1)$$

where y_t is the dependent variable (in our case: the budget balance), δ_j is a vector of estimated constants, i.e. the mean at the m + 1 different segments of the time series y_t and u_t is the error term. The Bai and Perron (B&P) filter generates the segmented route through the series that yields the lowest Sum of Squared Residuals (SSR) up to a maximum number of breaks. The maximum number of breaks is restricted by a trimming parameter h, which specifies a minimum number of observations that have to occur between consecutive breaks. We have

[5] This part of the paper draws on Wiese (2014).

set *h*=0.15. The process underlying the algorithm is straightforward. First, it searches for all possible sets of breaks up to a maximum, restricted by the trimming parameter *h*, and determines for each number of breaks the set that minimizes the SSR. Then a series of F-tests determine whether the improved fit produced by allowing an additional break is sufficiently large, compared to what can be expected randomly, on the basis of the asymptotic distribution derived in Bai and Perron (1998). Autocorrelation and potential heteroskedasticity is modeled non-parametrically by running the filter using a Heteroskedasticity and Autocorrelation Consistent (HAC) estimate of the variance–covariance matrix. As an alternative, we use the Bayesian Information Criterion (BIC) to select the optimal number of breaks.

The Bai & Perron method identifies the break date (fiscal adjustment initiation) as the first year after the structural break. We therefore take a one-year lag to identify the start of the fiscal adjustment. This method will identify the beginning, but not the end of a fiscal adjustment. We decided that the period of fiscal adjustment continues as long as the change in the cyclically adjusted budget balance is positive. We cannot identify breaks in the beginning and end of the sample due to the trimming parameter that has to be specified using the B&P filter. The appropriate number of observations has been dropped in the following analysis (i.e. 0.15 times the country specific sample length). Using this approach, we identify the fiscal adjustments as shown in Table 1.

As Table 1 shows, out of 674 yearly observations we identify 105 years with a fiscal adjustment using the baseline specification and 96 years with an adjustment using the BIC specification.

Table 1. Periods with fiscal adjustments

Filter specification	Baseline specification: Bai-Perron test (5% significance level)	Alternative specification: BIC in BP test
Country and sample length	Fiscal adjustment	Fiscal adjustment
Australia, 1989-2013	--	1996-98
Austria, 1977-2013	1995-97	1995-97
Belgium, 1971-2013	1983-87, 1992-98	1983-87, 1992-98
Canada, 1970-2013	1986-89, 1995-97	1986-89, 1995-97
Denmark, 1973-2013	1984-86, 1998-99	1984-86
Finland, 1977-2013	1995-98	1996-98
France, 1978-2013	1995-99, 2001	--
Germany, 1970-2013	1981-85	1981-85, 1995-00
Iceland, 1980-2013	1990-92, 1995-97	--
Italy, 1970-2013	1981-83, 1991-93	1981-83, 1991-93
Japan, 1971-2013	1983-90, 2005-06	1983-90
Netherlands, 1971-2013	1995-97	1995-97
New Zealand, 1987- 2013	--	--
Norway, 1980-2013	1994-97	1994-97
Portugal, 1981-2013	1984, 2009-13	--
Spain, 1979-2013	1986-87, 1995-99	1995-99
Sweden, 1973-2013	--	1984, 1996-98
Switzerland, 1990-2013	1998-99, 2005-08	1994-96, 1998-99, 2005-08
United Kingdom, 1972-2013	1979-82, 1995-00	1979-82, 1996-00
United States, 1967-2013	1994-98	1994-98

Notes: This table shows the identification of fiscal adjustments based on the Bai-Perron test and a variant thereof in which the optimal number of breaks is determined by the BIC. -- means that the filter does not identify any break. Luxembourg, Greece and Ireland were excluded from the analysis because we had too few observations for these countries to run the Bai-Perron filter.

The next step is to identify successful fiscal adjustments. Several criteria have been applied for this in the literature. Here we follow Alesina and Ardegna (2010) and define an adjustment as successful if the debt-to-GDP ratio has improved by 5%-points or more 3 years after the adjustment; otherwise it is unsuccessful. Table 2 shows the classification of successful and unsuccessful adjustments under both approaches to identify fiscal adjustments. Our baseline filter specification leads us to identify 43 (15) years with (episodes of) a successful adjustment and 58 (26) years (episodes) with an unsuccessful adjustment in the sample.

Table 2. Years with successful and unsuccessful adjustments

Data	Cyclically adjusted primary balance			
Filter specification	Baseline specification: Bai-Perron test (5% significance level)		Alternative specification: BIC in BP test	
Country	Successful adjustment	Unsuccessful adjustment	Successful adjustment	Unsuccessful adjustment
Australia	--	--	1996-98	--
Austria	--	1995-97	--	1995-97
Belgium	1993-98	1983-87, 1992	1993-98	1983-87, 1992
Canada	1995-97	1986-89	1995-97	1986-89
Denmark	1984-86, 1998-99	--	1984-86	--
Finland	1996-98	1995	1996-98	--
France	1998	1995-97, 1999, 2001	--	--
Germany	--	1981-85	--	1981-85, 1995-00
Iceland	1995-97	1990-92	--	--
Italy	1981-82	1983, 1991-93	1981-82	1983, 1991-1993
Japan	1986-88	1983-85, 1989-90	1986-88	1983-85, 1989-90
Netherlands	1995-97	--	1995-97	--
Norway	1995	1994, 1996-97	1995	1994, 1996-97
Portugal	--	1984, 2009	--	--
Spain	1996-99	1986-87, 1995	1996-99	1995
Sweden	--	--	1984, 1996-98	--
Switzerland	2005-06	1998-99, 2007-08	2005-06	1994-96, 1998-99, 2007-08
United Kingdom	1997-99	1979-82, 1995-96, 2000	1997-99	1979-82, 1996, 2000
United States	1995-98	1994	1995-98	1994
Total no. of years	43	58	44	51

Notes: This table shows the identification of successful and unsuccessful fiscal adjustments based on the fiscal adjustments identified in Table 1 using the Bai-Perron test and a variant thereof. The rule for defining successful adjustments (from Alesina and Ardegna, 2010) is that the debt-to-GDP ratio has improved by 5%-points or more 3 years after the adjustment. -- means that the filter does not identify any break.

Table 3 shows the outcomes if we use an 'ad hoc' filter to identify fiscal adjustments, defined by von Hagen et al. (2001), i.e. an improvement in the budget balance of 1.25% points in two or more consecutive years, or an improvement of 1.5% points preceded by a positive change in the budget balance. There are two reasons for showing the outcomes under this alternative definition of fiscal adjustment. First, as shown in Table 3, the identification of fiscal adjustments differs to quite some extent across different identification methods. Second, in our sensitivity analysis we will use this alternative definition of fiscal adjustments to check whether our main findings are driven by our preferred method to identify fiscal adjustments. The most interesting observation coming from Table 3 is that a much larger proportion of the adjustments identified using this type of filter is classified as unsuccessful (more than 50%). This suggests that these filters pick-up many short periods of fiscal adjustments that maybe more are a manifestation of 'noise' rather than deliberate policy actions, i.e., so-called type I errors.

Table 3. Rapid fiscal adjustments and successful fiscal adjustments

Data	Cyclically adjusted primary bl.		
Filter specification	An improvement in the budget balance of 1.25% points in two or more consecutive years, or an improvement of 1.5% points preceded by a positive change in the budget balance		
Country	Years with a rapid fiscal adjustment	Successful adjustment	Unsuccessful adjustment
Austria	1996-97, 2000-01	--	1996-97, 2000-01
Belgium	No adjustment	--	--
Canada	1986-87, 1994-97	1995-97	1986-87, 1994
Denmark	1983-86, 2003-05	1984-86, 2003-04	1983, 2005
Finland	1997-98	1997-98	--
Iceland	2004-05, 2009-2013	2004	2005, 2009-2013
Germany	1981-82, 1999-00	--	1981-82, 1999-00
Iceland	2004-05, 2009	2004	2005, 2009
Italy	1976-77, 1982-83, 1990-93, 1996-97, 2006-07	1982, 1997	1976-77, 1983, 1990-93, 1996, 2006-07
Japan	1983-84	--	1983-84
Netherlands	1972-73, 1982-83	1972	1973, 1982-83
New Zealand	1993-94	1993-94	--
Norway	1993-95, 1999-00, 2005-06	1995, 2006	1993-94, 1999-00, 2005
Portugal	1982-84		1982-84
Spain	1986-87, 1995-96	1996	1986-87, 1995, 2010
Sweden	1975-76, 1986-87, 1993-98	1986-87, 1996-98	1975-76, 1993-95
Switzerland	1998-99	--	1998-99
United Kingdom	1976-77, 1979-82, 1995-00	1977, 1997-99	1976, 1979-82, 1995-96, 2000
United States	1968-69		1968-69
Total no. of years	87	28	59

This table shows the identification results if we use the rule of von Hagen et al. (2001) to identify fiscal adjustments. Successful adjustments are defined in the same way as in Table 2.

As a first step in our analysis, we follow the approach of Alesina and his co-authors and compare the composition of successful with those of unsuccessful fiscal adjustments using simple comparison of the average change in expenditures and revenues. Table 4 shows the results. They are in line with the 'conventional view', no matter which filter we apply to identify fiscal adjustments. Regardless of whether our identification method or an 'ad hoc' filter is used, the improvement in the budget balance is a bit larger during successful adjustments compared to unsuccessful adjustments. Most importantly, successful adjustments are characterized by cutting expenditures, whereas most of the action in unsuccessful adjustments comes from increased revenues. To check whether this conclusion also holds if we control for economic and political-economy factors, we estimate a conditional fixed effects model in the next section.

Table 4. Average expenditure and revenue under successful and unsuccessful fiscal adjustments

	Obs.	Change in fiscal balance (Standard error)	Expenditure (Standard error)	Revenue (Standard error)
Filter:		Baseline specification: BP test		
Successful	40	1.183 (1.939)	-0.757 (1.125)	0.404 (0.876)
Unsuccessful	54	0.931 (1.403)	-0.188 (1.083)	0.441 (0.880)
Filter:		Alternative specification: BP test with BIC		
Successful	44	1.307 (1.906)	-0.808 (1.100)	0.453 (0.887)
Unsuccessful	51	0.997 (1.646)	-.203 (0.870)	.435 (0.799)
Filter:		Rapid fiscal adjustment (von Hagen et al. 2001)		
Successful	28	2.117 (1.082)	-1.231 (1.109)	0.776 (0 .856)
Unsuccessful	59	1.684 (1.550)	-0.229 (1.439)	0.838 (1.248)

This table shows the composition of successful and unsuccessful fiscal adjustments as identified in Tables 2 and 3. The upper part of the table shows the results if fiscal adjustments are identified using the Bai-Perron test, while the part in the middle shows the outcome using the alternative identification method shown in Table 2. The lower part shows the results for the fiscal adjustments identified in Table 3. Expenditure is the average of the change in the GDP share of total expenditure minus interest payments during the adjustment. Revenue is the average of the change in the GDP share of total revenues minus interest payments received during the adjustment. Standard errors are in parentheses.

3. Model and data

3.1 Model

As the success of a fiscal adjustment is often defined in terms of its impact on government debt, we start by the debt-to-GDP ratio in year t, which can be written as:

$$(D/Y)_t = \left(\frac{D}{Y}\right)_{t-1} + \left(\frac{Bal}{Y}\right)_t + (iD_{t-1}/Y)_t \quad (1)$$

where D is the debt-to-GDP, Bal (=T-G) is the primary balance, i.e. taxes (T) minus expenditure excl. interest payments (G), and iD are the interest payments on D. Rewriting gives:

$$\Delta\left(\frac{D}{Y}\right) = \Delta\left(\frac{Bal}{Y}\right) + \left(\frac{Bal}{Y}\right)_{t-1} + (iD_{t-1}/Y)_t = \Delta((T-G)/Y)) + \left(\frac{Bal}{Y}\right)_{t-1} + (iD_{t-1}/Y)_t \quad (2)$$

Alesina and Ardagna (2010) concentrate on the first component on the right hand side of this equation, thereby ignoring the initial balance and the interest payments on outstanding debt, which is driven by the interest rate and the amount of debt outstanding. Furthermore, as this equation is written in ratios, we should control for nominal income growth (i.e. real GDP growth and inflation).

Our estimation strategy follows Mierau et al. (2007), which allows us to examine whether the drivers of the likelihood that a fiscal adjustment occurs differ from the likelihood that a

successful fiscal adjustment occurs. Ardagna (2004) and Schaltegger and Feld (2009) use a similar approach.[6] We consider a panel discrete choice model in which the dependent variable is the occurrence of a successful fiscal adjustment in country *i* at time *t* ($y_{i,t}$). Following Mierau et al. (2007), we observe:

$$\begin{aligned} y_{it} &= 1 \quad if \quad y_{it}^{*} > 0 \\ y_{it} &= 0 \quad if \quad y_{it}^{*} \le 0 \end{aligned} \tag{3}$$

where: $y_{it}^{*} = x'_{it}\beta + \alpha_i + \nu_{it}$. This function can be interpreted as the inclination of the government to implement a successful fiscal adjustment, which is dependent on observed variables (x), unobserved individual (country) characteristics (α) and a random error term (ν). The probability that we observe a successful fiscal adjustment is:

$$P(y_{it} = 1) = P(y_{it}^{*} > 0) = P(\nu_{it} > -x'_{it}\beta - \alpha_i) = F(x'_{it}\beta + \alpha_i) \tag{4}$$

As the number of parameters to be estimated increases with the number of countries, it is impossible to estimate the parameters of this discrete choice model consistently. Instead, Chamberlain (1980) proposes conditional logit estimation in which the likelihood function is conditioned on a minimal sufficient statistic for the fixed effects. Chamberlain argues that $\sum_{t=1}^{T} y_{it}$ is such a minimum sufficient statistic, which in our case is the number of successful fiscal adjustments per country.

Variables in a panel model are likely to be temporally dependent, in which case ordinary logit models may result in biased inferences. We therefore follow the suggestion of Beck et al. (1998) to add a series of dummy variables to the model marking the number of years since the previous occurrence of an "event" (in our case a successful fiscal adjustment). To deal with the problem that many degrees of freedom are lost due to the large number of dummy variables, Beck et al. (1998) replace the dummy variables with a smooth function based on cubic splines. We follow two additional suggestions of Beck et al. by including the number of successful fiscal adjustments in the past and the length of the spell since the last successful adjustment to take into account that adjustments are not independent from one another.

3.2 Variables included

The economic variables included are the lagged cyclically adjusted budget balance, the debt-to-GDP ratio, the long-term interest rate on government debt, real GDP growth, and inflation. These variables have to be included as argued above. We also include the unemployment rate.

[6] Most of the empirical literature on fiscal adjustments considered only country-years in which there is evidence of large discretionary fiscal policy tightening. However, as pointed out by Ardagna (2004: 1058) "one loses valuable information by including in the sample only those episodes in which there is evidence of large fiscal contractions. " Our main finding that we cannot reject the hypothesis that the change in expenditures is equal to the change in revenues in successful fiscal adjustments also holds if we condition for the occurrence of a fiscal adjustment (results available on request).

Only few studies consider political economy drivers of (successful) fiscal adjustments.[7] We follow Mierau et al. (2007) who have tested several hypotheses concerning the likelihood that a fiscal adjustment occurs, independent of whether it was successful or not. We change their analysis by focusing on the likelihood of successful fiscal adjustments. We examine whether the following political-institutional variables (full details of their construction are provided in Appendix A1) affect the likelihood of a successful fiscal adjustment, by adding them one by one to our base model.

We consider two indicators of *political fragmentation of government*. A government that consists of political parties that are ideologically not very close to each other may find it difficult to agree on a fiscal adjustment. But once these parties agree on a fiscal adjustment, their commitment to these policies is high as none of the parties wants to be blamed for a failure of the adjustment (Leibrecht and Pitlik, 2015). We therefore hypothesize that the political fragmentation of the government may enhance the likelihood that we observe a successful fiscal adjustment. Following Mierau et al. (2007), the first measure of political fragmentation of the government is defined as:

$$\sum_j \left[\frac{NSEAT_j}{NSEAT} \times (COLOUR_j - PC)^2 \right]$$

where $NSEAT_j$ are the number of seats in parliament taken by party j, whilst $NSEAT$ refers to the total number of seats in parliament by the parties in government. $COLOUR_j$ indicates the ideological complexion of party j (ranging from 1 (left-wing) to 3 (right-wing)). PC refers to the ideological position of the entire government, i.e. the weighted position of all parties in government, using the seats in parliament as weights (see below). As an alternative, we also employ the *maximum ideological distance* between the parties forming a government (see also Mierau et al., 2007).

Our data on the ideology and composition of governments come from the World Bank's Database on Political Institutions (DPI). However, we hand checked the data for the composition of the government using several internet sources, as we discovered that DPI contains several mistakes. A very detailed database, also motivating where and why we deviate from DPI, is available on request.

[7] Mierau et al. (2007) and Ilera and Mulos-Granados (2008) examine the drivers of the probability of a fiscal adjustment (independent of whether they are successful or not). The former study finds that fiscal adjustments are primarily driven by economic factors and are hardly affected by political variables. The latter study finds that size fragmentation of the cabinet (measured by the number of parties in government and the number of spending ministers) influence the probability of ending fiscal consolidations (again independent of whether they were successful or not). Tavares (2004) reports evidence in support of the hypothesis that the left is more credible than the right when cutting expenditures and the right more credible when it increases taxes. He also finds that coalition governments are less likely to have successful fiscal adjustments. Likewise, for the case of Swiss cantons, Schaltegger and Feld (2009) find some (weak) evidence that coalition cabinets have more difficulties in successfully implementing adjustment policies. These studies do not examine the political fragmentation of government.

We include two indicators of *size fragmentation of government*, i.e. government fragmentation captured by the effective number of government parties (see Volkerink and de Haan 2001) and the number of spending ministers in government. According to Perotti and Kontopoulos (2002), size fractionalisation of government affects fiscal policy outcomes due to a "common-pool problem" in which competing political groups (political parties or spending ministers) vie for government expenditures that are financed using broad-based tax revenues (Mierau et al. 2007). Therefore, size fragmentation is hypothesized to negatively influence the likelihood of a successful fiscal adjustment.

We include a dummy for a *new government*. This variable is one when there is a post election change in the government, i.e., a new coalition or ruling party, and zero otherwise. According to Haggard and Webb (1994: 8), new governments "typically enjoy a period in which the costs of adjustment can be traded against political gains". So we hypothesize that the likelihood of a successful fiscal adjustment increases when there is a new government.

We consider a variable reflecting the *strength of government* in parliament, defined as the number of government seats above/below what is needed for a majority, weighted by the total number of seats of the government (see Volkerink and de Haan 2001). We hypothesize that governments having a strong political position are in a better position to implement a successful fiscal adjustment. Arguably, governments that have more support in parliament face fewer hurdles to take tough decisions concerning adjustment policies (Mierau et al., 2007). The more seats that the parties forming the government have in parliament, the stronger the government will be.

We follow Mierau et al. (2007) and include a variable for the *ideological position of the government* which is defined as

$$\text{PC}= \sum_j \frac{NSEAT_j \times COLOUR_j}{NSEAT},$$

There is evidence that the ideological position of the government affects fiscal policy adjustments (Mulas-Granados 2003; Tavares 2004). The latter study finds that left-wing governments tends to reduce the deficit by raising tax revenues while right-wing governments rely mostly on spending cuts.

The *political budget cycle* (PBC) literature (see de Haan and Klomp 2013 for a recent survey) suggests that fiscal adjustments are unlikely under an *upcoming election*, since an adjustment requires unpopular measures. We therefore include a dummy that is one in case of an upcoming election (i.e., an election, be that regular or early, in the following year).

Finally, we include two measures for *political instability*. First, a dummy variable which equals 1 when there is a change of cabinet and 0 otherwise. In line with our data source (the Cross National Data Archive), a cabinet change is defined as any situation in which a new president/prime minister is appointed or when at least 50% of the ministers are replaced. In addition, we employ a dummy variable, which equals 1 when there is a major government crisis and 0 otherwise. The Cross National Data Archive defines a major crisis as a rapidly developing situation that threatens to bring the downfall of the present regime. As a fiscal adjustment requires a longer-term horizon of policy makers, which is generally lacking in

highly unstable regimes, we hypothesize that these measures will be negatively related to the likelihood of a successful fiscal adjustment.

4. Estimation results

The panel used is unbalanced. We include as many observations as possible in all regressions. Table 5 shows the outcomes. Strikingly, we cannot reject the hypothesis that the effect of the change in expenditure is equal to the effect of the change in revenues. This holds for all models as shown in columns (1)-(14) of Table 5.

Our results suggest that most political-economy variables are not significantly different from zero. However, we find evidence that political fragmentation of the government is related to successful fiscal adjustments. The coefficients of *maximum ideological distance* and *government fractionalization* are positive and statistically significant. Also a few other political economy variables are significant, but these results turn out not to be robust. Once we use successful fiscal adjustments based on our alternative filter to identify fiscal adjustments these variables become insignificant as shown in Table 6. However, our proxies for political fragmentation remain significant in Table 6.

Also our finding that we cannot reject the hypothesis that the effect of the change in expenditure is equal to the effect of the change in revenues in successful fiscal adjustments holds true. The coefficient of spending cuts is generally not significantly different (higher) than the coefficient of tax increases, as shown by the Wald test-statistics. This finding contradicts the 'conventional view'.

Table 5. Conditional fixed effects model for the drivers of successful fiscal adjustments (baseline specification of adjustments)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Δ Expenditure	-0.795***	-0.719***	-0.740***	-0.952***	-0.900***	-0.878***	-0.918***	-1.032***	-0.931***	-0.913***	-0.926***	-1.036***	-0.967***	-0.954***
	(0.000)	(0.000)	(0.001)	(0.003)	(0.005)	(0.007)	(0.008)	(0.002)	(0.004)	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)
Δ Revenue	0.511***	0.551***	0.725***	0.874***	0.984***	0.987***	1.014***	0.916***	0.911***	0.895***	0.905***	0.924***	0.893***	0.880***
	(0.005)	(0.003)	(0.005)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Debt/GDP		0.041***	0.039***	0.031*	0.027	0.026	0.017	0.038**	0.032*	0.028	0.029	0.029	0.035*	0.031*
		(0.001)	(0.006)	(0.082)	(0.159)	(0.176)	(0.396)	(0.044)	(0.074)	(0.128)	(0.128)	(0.115)	(0.062)	(0.083)
Structural balance t-1				0.127	0.127	0.169	0.152	0.146	0.132	0.128	0.137	0.126	0.142	0.129
				(0.303)	(0.330)	(0.216)	(0.229)	(0.236)	(0.281)	(0.296)	(0.281)	(0.325)	(0.255)	(0.301)
GDP growth rate				-0.131	-0.043	-0.023	-0.037	-0.164	-0.089	-0.095	-0.063	-0.122	-0.089	-0.130
				(0.562)	(0.845)	(0.919)	(0.880)	(0.470)	(0.699)	(0.690)	(0.780)	(0.590)	(0.694)	(0.566)
Unemployment rate				0.031	0.139	0.168	0.193	0.090	0.055	0.109	0.088	0.057	0.044	0.036
				(0.861)	(0.461)	(0.383)	(0.348)	(0.634)	(0.761)	(0.570)	(0.631)	(0.750)	(0.807)	(0.841)
Inflation rate				-0.155	-0.082	-0.084	0.016	-0.137	-0.101	-0.058	-0.117	-0.140	-0.151	-0.148
				(0.365)	(0.635)	(0.628)	(0.933)	(0.436)	(0.556)	(0.745)	(0.491)	(0.421)	(0.392)	(0.387)
Interest rate gov. debt				-0.046	-0.171	-0.191	-0.268	-0.057	-0.126	-0.193	-0.124	-0.074	-0.049	-0.044
				(0.782)	(0.303)	(0.252)	(0.162)	(0.733)	(0.465)	(0.291)	(0.468)	(0.665)	(0.772)	(0.787)
Spline 1			-0.128***	-0.122***	-0.133***	-0.120***	-0.149***	-0.132***	-0.125***	-0.119***	-0.113***	-0.136***	-0.129***	-0.122***
			(0.001)	(0.004)	(0.003)	(0.006)	(0.002)	(0.003)	(0.003)	(0.005)	(0.007)	(0.003)	(0.003)	(0.004)
Spline 2			0.077***	0.071**	0.079**	0.069**	0.086***	0.077**	0.072**	0.068**	0.064**	0.079**	0.077**	0.071**
			(0.006)	(0.017)	(0.010)	(0.023)	(0.009)	(0.012)	(0.015)	(0.021)	(0.031)	(0.011)	(0.011)	(0.017)
Spline 3			-0.014*	-0.011	-0.014	-0.011	-0.014	-0.012	-0.011	-0.011	-0.009	-0.013	-0.013	-0.011
			(0.069)	(0.161)	(0.101)	(0.193)	(0.118)	(0.130)	(0.156)	(0.195)	(0.282)	(0.125)	(0.107)	(0.168)
# previous successful adjustments			-0.469**	-0.944***	-1.191***	-1.255***	-1.083***	-0.969***	-1.081***	-1.148***	-1.104***	-1.023***	-0.938***	-0.944***
			(0.019)	(0.003)	(0.001)	(0.000)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)
Years no successful adjustments			-2.530***	-2.608***	-2.760***	-2.636***	-3.099***	-2.810***	-2.674***	-2.600***	-2.506***	-2.869***	-2.672***	-2.612***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ideological fragmentation					2.464*									
					(0.052)									
Max ideological dist.						1.231**								
						(0.019)								
Effective # of gov. parties							1.370*							
							(0.054)							
# of spending ministers								0.182						
								(0.190)						
New government									-0.234					
									(0.662)					
Excess seats in government										2.436				
										(0.455)				
Ideological complexion											-0.554			

											(0.144)			
Upcoming election												-0.922*		
												(0.090)		
Major cabinet changes													0.512	
													(0.274)	
Government crises														-0.369
														(0.543)
Wald-test: -1* Δ Expenditure = Δ revenue	(0.208)	(0.450)	(0.952)	(0.816)	(0.801)	(0.746)	(0.785)	(0.728)	(0.954)	(0.956)	(0.950)	(0.730)	(0.826)	(0.824)
Observations	406	406	406	398	396	396	393	398	393	391	393	397	375	398
Number of identifiers	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Pseudo R-squared	0.135	0.205	0.485	0.538	0.569	0.578	0.565	0.545	0.549	0.551	0.558	0.562	0.541	0.539

P-values of z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 6. Conditional fixed effects model for the drivers of successful fiscal adjustments (alternative specification of adjustment)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Δ Expenditure	-1.044***	-0.915***	-0.956***	-0.947***	-0.970***	-1.006***	-0.923***	-0.976***	-0.924***	-0.909***	-0.940***	-0.975***	-0.975***	-0.946***
	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
Δ Revenue	0.612***	0.613***	0.681***	0.756***	0.829***	0.866***	0.849***	0.756***	0.798***	0.761***	0.777***	0.782***	0.734***	0.761***
	(0.002)	(0.002)	(0.005)	(0.004)	(0.002)	(0.002)	(0.002)	(0.004)	(0.003)	(0.005)	(0.004)	(0.003)	(0.005)	(0.004)
Debt/GDP		0.039***	0.049***	0.054***	0.054**	0.055**	0.049**	0.057***	0.056***	0.050**	0.052***	0.053***	0.061***	0.054***
		(0.001)	(0.001)	(0.006)	(0.014)	(0.012)	(0.017)	(0.005)	(0.006)	(0.012)	(0.009)	(0.008)	(0.004)	(0.007)
Structural balance t-1				0.194	0.202	0.253*	0.223*	0.205	0.199	0.176	0.192	0.191	0.229*	0.197
				(0.133)	(0.140)	(0.077)	(0.091)	(0.116)	(0.126)	(0.175)	(0.135)	(0.146)	(0.088)	(0.131)
GDP growth rate				-0.043	-0.007	0.018	0.008	-0.055	0.010	-0.015	0.001	-0.030	0.010	-0.041
				(0.859)	(0.978)	(0.940)	(0.974)	(0.820)	(0.967)	(0.953)	(0.998)	(0.902)	(0.968)	(0.867)
Unemployment rate				0.040	0.129	0.138	0.107	0.046	0.037	0.099	0.060	0.044	0.039	0.042
				(0.787)	(0.413)	(0.390)	(0.503)	(0.757)	(0.805)	(0.522)	(0.689)	(0.766)	(0.800)	(0.774)
Inflation rate				-0.149	-0.099	-0.097	-0.079	-0.138	-0.123	-0.062	-0.096	-0.131	-0.155	-0.141
				(0.357)	(0.552)	(0.553)	(0.629)	(0.401)	(0.452)	(0.708)	(0.552)	(0.428)	(0.352)	(0.388)
Interest rate gov. debt				0.066	-0.068	-0.085	-0.050	0.072	0.007	-0.098	-0.024	0.018	0.091	0.067
				(0.700)	(0.694)	(0.620)	(0.777)	(0.675)	(0.966)	(0.588)	(0.890)	(0.920)	(0.615)	(0.695)
Spline 1			-0.097***	-0.088***	-0.103***	-0.093***	-0.086***	-0.090***	-0.091***	-0.085***	-0.090***	-0.093***	-0.092***	-0.088***
			(0.001)	(0.006)	(0.002)	(0.004)	(0.009)	(0.005)	(0.005)	(0.007)	(0.006)	(0.004)	(0.005)	(0.005)
Spline 2			0.059***	0.053**	0.065***	0.058***	0.051**	0.054**	0.055**	0.051**	0.054**	0.056**	0.058**	0.053**
			(0.004)	(0.015)	(0.004)	(0.010)	(0.023)	(0.014)	(0.012)	(0.020)	(0.015)	(0.012)	(0.011)	(0.014)
Spline 3			-0.011**	-0.010*	-0.014**	-0.012**	-0.009	-0.010*	-0.011*	-0.010	-0.010*	-0.011*	-0.012**	-0.010*
			(0.046)	(0.078)	(0.022)	(0.047)	(0.117)	(0.077)	(0.072)	(0.106)	(0.088)	(0.070)	(0.045)	(0.079)
# previous successful adjustments			-0.640***	-1.007***	-1.389***	-1.402***	-1.181***	-0.998***	-1.139***	-1.216***	-1.138***	-1.121***	-1.001***	-1.011***
			(0.002)	(0.002)	(0.000)	(0.000)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)

Years no successful adjustments			-2.034***	-1.933***	-2.106***	-1.992***	-1.969***	-1.981***	-1.986***	-1.924***	-1.985***	-2.039***	-1.950***	-1.940***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ideological fragmentation					3.650**									
					(0.021)									
Max ideological dist.						1.440***								
						(0.007)								
Effective # of gov. parties							0.900							
							(0.104)							
# of spending ministers								0.096						
								(0.546)						
New government									-0.803					
									(0.153)					
Excess seats in government										4.140				
										(0.215)				
Ideological complexion											-0.074			
											(0.835)			
Upcoming election												-0.443		
												(0.394)		
Major cabinet changes													0.707	
													(0.128)	
Government crises														-0.365
														(0.549)
Wald-test: -1* Δ Expenditure = Δ revenue	(0.065)	(0.204)	(0.332)	(0.613)	(0.711)	(0.713)	(0.849)	(0.561)	(0.750)	(0.703)	(0.668)	(0.609)	(0.536)	(0.625)
Observations	403	403	403	403	401	401	398	401	398	396	398	402	379	403
Number of identifiers	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Pseudo R-squared	0.179	0.242	0.516	0.544	0.587	0.591	0.564	0.544	0.563	0.561	0.554	0.557	0.555	0.546

P-values of z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 7. Conditional fixed effects model for the drivers of rapid successful fiscal adjustments

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Δ Expenditure	-1.093***	-0.871***	-1.057***	-1.510***	-1.457***	-1.478***	-1.473***	-1.626***	-1.320***	-1.480***	-1.557***	-1.742***	-1.514***	-1.512***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.003)	(0.003)	(0.004)	(0.001)	(0.005)	(0.003)	(0.003)	(0.002)	(0.001)	(0.001)
Δ Revenue	0.799***	0.804***	0.929***	1.070***	1.445***	1.390***	1.406***	1.109***	1.679***	1.427***	1.460***	1.206***	1.026***	1.082***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)
Debt/GDP		0.060***	0.064***	0.089***	0.119***	0.118***	0.119***	0.094***	0.155***	0.130***	0.145***	0.115***	0.104***	0.099***
		(0.002)	(0.009)	(0.005)	(0.007)	(0.008)	(0.005)	(0.005)	(0.002)	(0.002)	(0.004)	(0.008)	(0.007)	(0.005)
Structural balance t-1				-0.100	-0.024	-0.032	-0.001	-0.041	0.026	-0.038	-0.155	-0.078	-0.226	-0.076
				(0.501)	(0.889)	(0.851)	(0.997)	(0.803)	(0.878)	(0.820)	(0.387)	(0.653)	(0.224)	(0.626)
GDP growth rate				-0.168	0.046	0.008	0.013	-0.222	0.164	0.083	0.002	-0.132	-0.201	-0.191

				(0.544)	(0.890)	(0.981)	(0.970)	(0.429)	(0.638)	(0.806)	(0.995)	(0.716)	(0.483)	(0.494)
Unemployment rate				-0.039	-0.018	-0.061	-0.063	-0.031	-0.097	0.012	-0.198	-0.100	-0.137	-0.049
				(0.853)	(0.948)	(0.820)	(0.804)	(0.887)	(0.704)	(0.963)	(0.437)	(0.672)	(0.560)	(0.821)
Inflation rate				0.344*	0.410**	0.400**	0.439**	0.331*	0.598**	0.464**	0.361**	0.363*	0.328*	0.334*
				(0.052)	(0.027)	(0.029)	(0.024)	(0.051)	(0.013)	(0.017)	(0.035)	(0.062)	(0.061)	(0.066)
Interest rate gov. debt				-0.482**	-0.369*	-0.413*	-0.417*	-0.474**	-0.560*	-0.447*	-0.320	-0.342	-0.566**	-0.472**
				(0.029)	(0.098)	(0.074)	(0.069)	(0.025)	(0.052)	(0.060)	(0.143)	(0.169)	(0.017)	(0.038)
Spline 1			-0.056***	-0.069***	-0.079***	-0.075***	-0.084***	-0.079***	-0.090***	-0.075***	-0.071**	-0.076***	-0.070***	-0.068***
			(0.003)	(0.003)	(0.006)	(0.006)	(0.006)	(0.003)	(0.004)	(0.009)	(0.012)	(0.006)	(0.003)	(0.005)
Spline 2			0.031**	0.036**	0.040**	0.038**	0.044**	0.042**	0.049**	0.037**	0.032*	0.039**	0.037**	0.035**
			(0.012)	(0.018)	(0.033)	(0.038)	(0.027)	(0.013)	(0.023)	(0.049)	(0.086)	(0.035)	(0.017)	(0.025)
Spline 3			-0.003	-0.002	-0.002	-0.001	-0.003	-0.003	-0.005	-0.001	0.002	-0.001	-0.002	-0.002
			(0.303)	(0.677)	(0.748)	(0.866)	(0.631)	(0.474)	(0.468)	(0.862)	(0.793)	(0.812)	(0.612)	(0.669)
# previous successful adjustments			-0.618**	-1.084**	-0.891*	-0.940*	-0.818	-1.292**	-1.141*	-1.000*	-0.653	-0.819	-0.992*	-1.067**
			(0.024)	(0.026)	(0.089)	(0.076)	(0.102)	(0.020)	(0.068)	(0.081)	(0.214)	(0.128)	(0.084)	(0.026)
Years no successful adjustments			-1.924***	-2.472***	-2.802***	-2.756***	-2.898***	-2.785***	-3.034***	-2.765***	-2.775***	-2.738***	-2.459***	-2.456***
			(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
Ideological fragmentation					3.298									
					(0.342)									
Max ideological dist.						0.708								
						(0.376)								
Effective # of gov. parties							0.945							
							(0.340)							
# of spending ministers								0.259						
								(0.239)						
New government									-1.168					
									(0.189)					
Excess seats in government										10.982				
										(0.126)				
Ideological complexion											-0.973*			
											(0.091)			
Upcoming election												-1.003		
												(0.228)		
Major cabinet changes													0.433	
													(0.444)	
Government crises														0.910
														(0.246)
Wald-test: -1* Δ Expenditure = Δ revenue	(0.244)	(0.797)	(0.662)	(0.298)	(0.981)	(0.870)	(0.898)	(0.249)	(0.531)	(0.920)	(0.851)	(0.277)	(0.253)	(0.322)
Observations	366	366	366	355	305	305	305	350	301	303	305	309	312	355
Number of identifiers	11	11	11	11	10	10	10	11	10	10	10	10	11	11
Pseudo R-squared	0.291	0.365	0.561	0.609	0.653	0.651	0.651	0.615	0.669	0.662	0.668	0.650	0.608	0.617

P-values of z-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 8. Robustness to alternative definition of successfulness, fixed effects estimates

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Δ Expenditure	-0.778***	-0.736***	-0.632***	-0.908***	-0.898***	-0.947***	-0.945***	-0.947***	-0.898***	-0.899***	-0.919***	-0.914***	-0.878***	-0.908***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Δ Revenue	0.613***	0.642***	0.737***	0.953***	1.032***	1.051***	1.045***	0.949***	0.957***	0.958***	0.960***	0.965***	0.930***	0.950***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Debt/GDP		0.020***	0.043***	0.045***	0.040***	0.040***	0.033**	0.047***	0.046***	0.041***	0.043***	0.045***	0.050***	0.045***
		(0.005)	(0.000)	(0.002)	(0.009)	(0.010)	(0.038)	(0.002)	(0.002)	(0.007)	(0.005)	(0.002)	(0.001)	(0.002)
Structural balance t-1				0.289***	0.266**	0.301***	0.326***	0.292***	0.289***	0.276**	0.308***	0.293***	0.291***	0.288***
				(0.008)	(0.017)	(0.008)	(0.004)	(0.007)	(0.008)	(0.012)	(0.005)	(0.007)	(0.007)	(0.008)
GDP growth rate				-0.205	-0.198	-0.216	-0.230	-0.227	-0.191	-0.209	-0.184	-0.191	-0.210	-0.206
				(0.199)	(0.212)	(0.179)	(0.178)	(0.160)	(0.236)	(0.208)	(0.253)	(0.237)	(0.192)	(0.197)
Unemployment rate				-0.042	0.012	0.025	0.012	-0.033	-0.031	-0.000	0.003	-0.031	-0.064	-0.043
				(0.736)	(0.925)	(0.845)	(0.934)	(0.797)	(0.807)	(0.998)	(0.983)	(0.802)	(0.608)	(0.731)
Inflation rate				-0.111	-0.091	-0.086	-0.043	-0.114	-0.076	-0.059	-0.074	-0.090	-0.107	-0.114
				(0.336)	(0.426)	(0.457)	(0.719)	(0.327)	(0.522)	(0.621)	(0.524)	(0.436)	(0.360)	(0.328)
Interest rate gov. debt				0.079	-0.010	-0.007	-0.037	0.079	0.041	-0.005	0.039	0.054	0.064	0.082
				(0.461)	(0.927)	(0.951)	(0.756)	(0.464)	(0.715)	(0.964)	(0.723)	(0.613)	(0.541)	(0.446)
Spline 1			-0.308***	-0.313***	-0.317***	-0.306***	-0.333***	-0.314***	-0.313***	-0.309***	-0.305***	-0.313***	-0.312***	-0.313***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Spline 2			0.160***	0.160***	0.161***	0.155***	0.169***	0.160***	0.160***	0.157***	0.154***	0.160***	0.162***	0.160***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Spline 3			-0.020***	-0.018**	-0.018**	-0.017**	-0.019**	-0.019**	-0.018**	-0.018**	-0.017**	-0.018**	-0.020***	-0.018**
			(0.006)	(0.014)	(0.016)	(0.023)	(0.014)	(0.013)	(0.015)	(0.019)	(0.026)	(0.016)	(0.009)	(0.014)
# previous successful adjustments			-0.392***	-0.648***	-0.759***	-0.746***	-0.683***	-0.646***	-0.673***	-0.704***	-0.702***	-0.669***	-0.671***	-0.647***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Years no successful adjustments			-3.254***	-3.357***	-3.432***	-3.350***	-3.554***	-3.378***	-3.376***	-3.352***	-3.325***	-3.377***	-3.298***	-3.360***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ideological fragmentation					1.784**									
					(0.035)									
Max ideological dist.						0.787**								
						(0.021)								
Effective # of gov. parties							1.545**							
							(0.019)							
# of spending ministers								0.092						
								(0.373)						
New government									-0.040					
									(0.923)					
Excess seats in government										3.207				

										(0.216)				
Ideological complexion											-0.252			
											(0.381)			
Upcoming election												-0.118		
												(0.773)		
Major cabinet changes													0.022	
													(0.955)	
Government crises														-0.070
														(0.845)
Wald-test:	(0.375)	(0.613)	(0.639)	(0.866)	(0.617)	(0.697)	(0.719)	(0.994)	(0.827)	(0.830)	(0.879)	(0.852)	(0.843)	(0.875)
-1* Δ Expenditure = Δ revenue														
Observations	493	493	493	485	483	483	480	485	479	476	480	484	456	485
Number of identifiers	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Pseudo R-squared	0.126	0.151	0.478	0.524	0.542	0.545	0.546	0.527	0.527	0.533	0.530	0.529	0.523	0.524

5. Sensitivity analysis

Table 7 shows what triggers rapid successful adjustments when the filter of von Hagen et al. (2001) is used to identify fiscal adjustments. Using this filter, we identify fewer successful adjustments. Two conclusions can be drawn. Most importantly, our main finding that that we cannot reject the hypothesis that the effect of the change in expenditure is equal to the effect of the change in revenues in successful fiscal adjustments also holds for rapid fiscal adjustments. However, except for *PC*, none of the political economy variables is significant. This also holds for our proxies for political fragmentation. Apparently, political fragmentation does not play a role when fiscal adjustments take place rapidly. This finding is not inconsistent with our hypothesis that political fragmentation plays a role in determining the ability to commit to maintaining a given policy. This ability especially plays a role if policies have to be maintained over a longer period.

Finally, Table 8 shows the results if we use an alternative definition of successfulness as suggested by Tavares (2004). According to Tavares (2004), an adjustment is successful if the total change in the primary deficit in the 3 years after the tight period has improved by 1% point (or more) of GDP or, 3 years after the initial adjustment year, the debt-to-GDP ratio is 5% below its level before the tight period. This definition also takes accumulated changes in the primary balance as a result of fiscal adjustments into account. This has the implication that a larger number of the identified adjustments can be characterized as successful. Therefore the fixed-effects regression includes more countries and observations when this definition is used. The identified successful adjustments under this definition are shown in Appendix 2. As Table 8 shows, our main conclusions also hold under this alternative definition. First, we cannot reject the hypothesis that the effect of the change in expenditure is equal to the effect of the change in revenues in successful fiscal adjustments. Second, our proxies for political fragmentation are significant suggesting that political fragmentation of governments is an important determinant of successful fiscal adjustments.

6. Conclusion

In this paper we re-examined whether successful fiscal adjustments are characterized by spending cuts. In addition, we considered several potential political-economy determinants of successful fiscal adjustments. Instead of relying on ad hoc methods, we applied the Bai and Perron (1998, 2003) structural break filter to detect statistically significant changes in fiscal policy in OECD countries. Following definitions of successful adjustments as applied previously in the literature, we determined whether the identified adjustments were successful. Finally, we estimated conditional fixed effects models. Our regressions suggest that the conclusion of most previous studies that successful fiscal adjustments rely on expenditure cuts is not robust. In our models, in which we control for factors such as indebtedness and the initial government budget balance, we cannot reject the hypothesis that the change in expenditure is equal to the change in revenues. Finally, our results provide evidence that the political

fragmentation of government positively affects the likelihood to observe a successful fiscal adjustment. This supports our hypothesis that if political parties that are ideologically very different from each other agree on a fiscal adjustment, they have a very strong incentive to make the fiscal adjustment successful.

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Appendix A1. Description of variables and sources

Table A1.1: Summary statistics and data source of economic variables

Variable	Obs.	Mean	St.d.	Min.	Max.	Source
Δ Expenditure as % of GDP minus interests	818	0.289	1.385	-4.882	8.399	OECD.org
Δ Revenue as % of GDP minus interests	806	0.198	1.093	-4.135	5.881	OECD.org
Debt/GDP	805	59.881	30.959	7.994	226.823	OECD.org
Structural balance t-1	734	-0.451	2.983	-16.041	7.175	OECD.org
GDP growth rate	940	2.665	2.537	-8.227	13.060	OECD.org
Unemployment rate	925	5.707	3.491	0.003	22.938	OECD.org
Inflation rate (CPI)	928	5.462	6.503	-1.3	84	OECD.org
Interest rate (on long term) gov. debt	909	7.723	3.927	1.003	29.742	OECD.org

For the debt-to-GDP ratio for Iceland and Portugal we use data from IMF due to missing observations in the OECD data.

Table A1.2: Summary statistics and data source of political variables

Variable	Obs.	Mean	St.d.	Min.	Max.	Source
Ideological fragmentation	754	0.199	0.320	0	1	Update of Beck et al. (2001)
Max ideological dist.	754	0.638	0.850	0	2	Update of Beck et al. (2001)
Effective # of gov. parties	748	1.651	0.776	0	3.932	Update of Beck et al. (2001)
# of spending ministers	806	15.744	4.475	6	33	Update of Mierau et al. (2007)
New government	740	0.289	0.453	0	1	Update of Mierau et al. (2007)
Excess seats in government	743	0.059	0.121	-0.388	0.494	Update of Beck et al. (2001)
Ideological complexion	748	2.049	0.818	1	3	Update of Beck et al. (2001)
Upcoming election	740	0.289	0.453	0	1	Update of Mierau et al. (2007)
Major cabinet changes	800	0.347	0.565	0	3	Cross National Data Archive
Government crises	880	0.231	0.607	0	5	Cross National Data Archive

Appendix A2. Identified successful adjustments using alternative definition of successfulness

Filter specification	Baseline specification, but alternative definition of successfulness, Tavares (2004)	
Country and sample length	Fiscal adjustment	Successful adjustment
Australia, 1989-2013	--	--
Austria, 1977-2013	1995-97	1996-97
Belgium, 1971-2013	1983-87, 1992-98	1984-87, 1992-98
Canada, 1970-2013	1986-89, 1995-97	1995-1997
Denmark, 1973-2013	1984-86, 1998-99	1984-86, 1998-99
Finland, 1977-2013	1995-98	1996-98
France, 1978-2013	1995-99, 2001	1997-99
Germany, 1970-2013	1981-85	1982-85
Iceland, 1980-2013	1990-92, 1995-97	1995-97
Italy, 1970-2013	1981-83, 1991-93	1981-82, 1991-93
Japan, 1971-2013	1983-90, 2005-06	1984-90
Netherlands, 1971-2013	1995-97	1995-97
New Zealand, 1987- 2013	--	--
Norway, 1980-2013	1994-97	1995
Portugal, 1981-2013	1984, 2009-13	1984
Spain, 1979-2013	1986-87, 1995-99	1996-99
Sweden, 1973-2013	--	--
Switzerland, 1990-2013	1998-99, 2005-08	1999, 2005-2008
United Kingdom, 1972-2013	1979-82, 1995-00	1980-82, 1996-2000
United States, 1967-2013	1994-98	1994-98

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